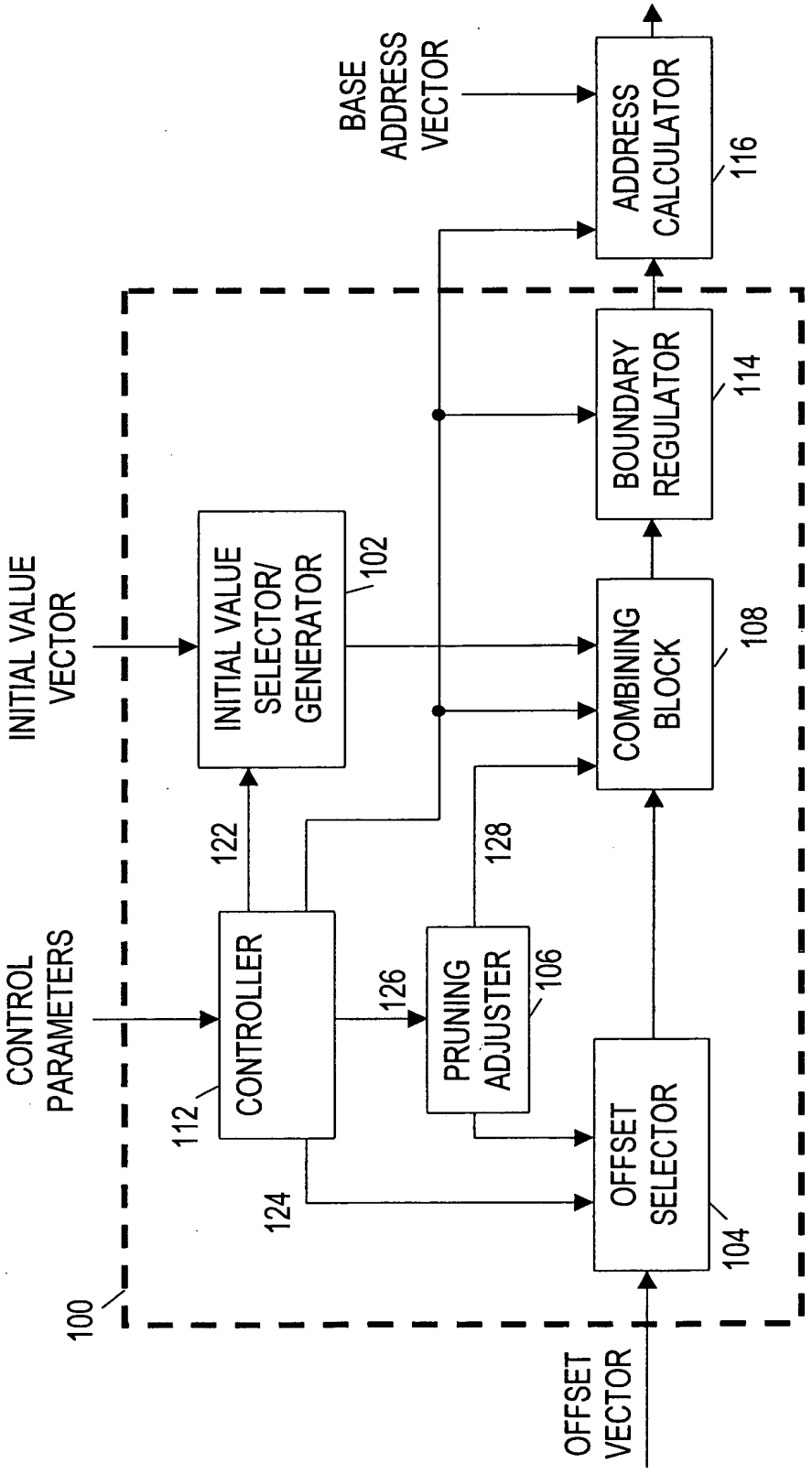
BASE ADDRESS VECTOR
ADDRESS CALCULATOR
116
BOUNDARY REGULATOR
114
INITIAL VALUE VECTOR
INITIAL VALUE SELECTOR/ GENERATOR
102
COMBINING BLOCK
108
122
128
CONTROL PARAMETERS
CONTROLLER
112
126
PRUNING ADJUSTER
106
124
OFFSET SELECTOR
104
100
OFFSET VECTOR

Figure 1

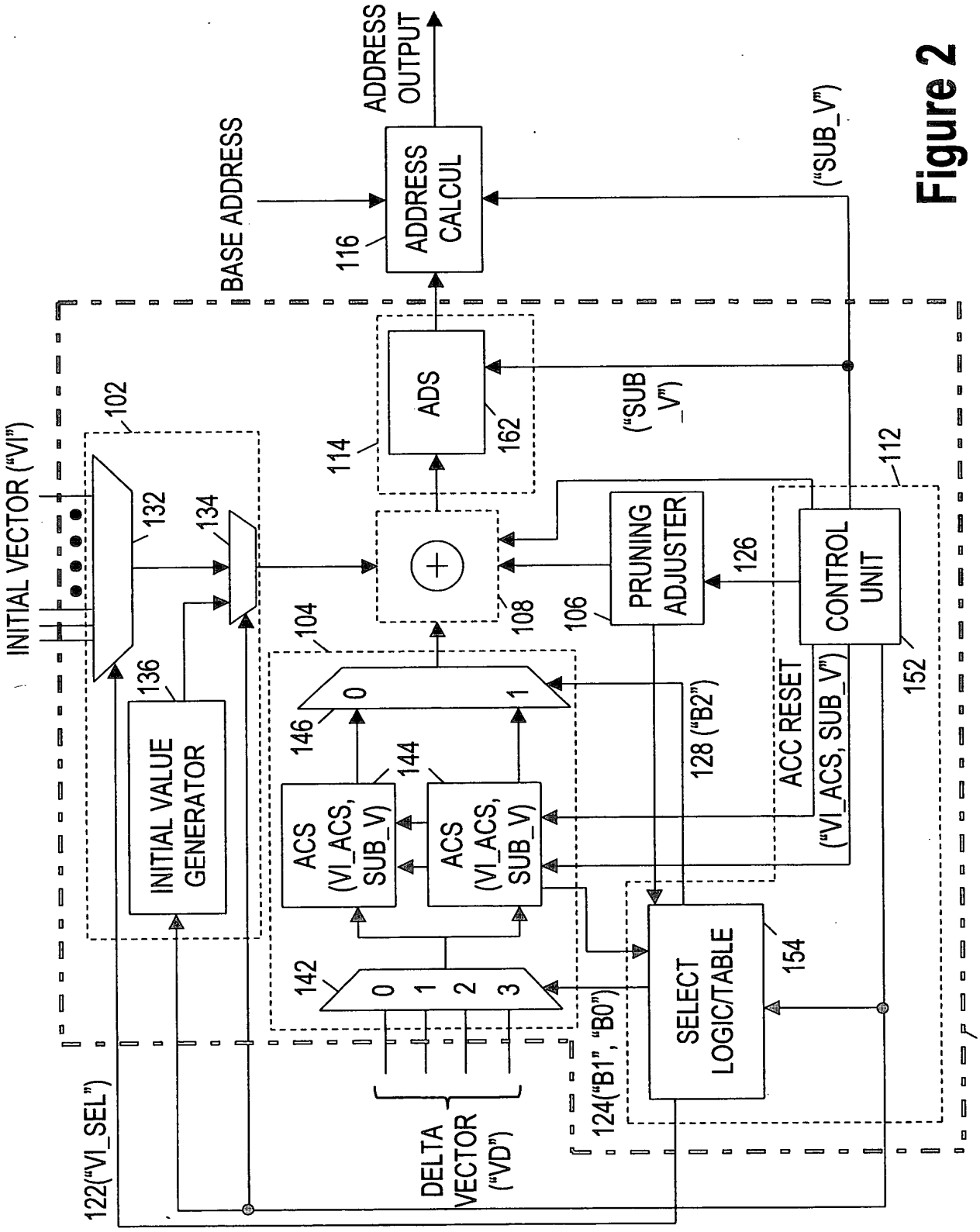
ADDRESS OUTPUT
BASE ADDRESS
116
ADDRESS CALCUL
("SUB_V")
INITIAL VECTOR ("VI")
102
114
ADS
162
("SUB_V")
112
132
134
PRUNING ADJUSTER
126
CONTROL UNIT
108
106
104
136
INITIAL VALUE GENERATOR
146
144
128 ("B2")
ACC RESET
("VI_ACS, SUB_V")
152
ACS (VI_ACS, SUB_V)
ACS (VI_ACS, SUB_V)
142
SELECT LOGIC/TABLE
154
124("B1", "B0")
DELTA VECTOR ("VD")
122("VI_SEL")
101

Figure 2

(1) **3.1.3 (TABLE 1 IN [1]) OF GSM 05.03 V8.5.0 RELEASE 1999**

K=0:455;
B=MOD(K,8);
J=2*MOD(49*K,57)+FLOOR(MOD(K,8)/4); (DEPTH 8) } 301

PARAMETERS	**INTERLEAVER VALUES**	**DE-INTERLEAVER VALUES**
INITIAL VECTOR ("VI")	(0, 98, 82, 66)	(0, 228), (57, 285), (114, 342), (171, 399)
VI CONTROL ("VI_SEL")	K[B1B0]. (RPT(0,1,2,3))	J[B0]. (RPT(0,1))
DELTA VECTOR ("VD")	(49, 51)	(64)
ACS INITIAL VALUE ("ACS_VI")	0	0
ACS UPDATE RATE	¼	1/2
ADJUST VALUE ("SUBTRACT_V")	114	456
SELECT LINE 1 FOR VD MULTIPLEXER ("B0")	K[B2]. (RPT(00001111))	0
SELECT LINE 2 FOR VD MULTIPLEXER ("B1")	0	0
SELECT LINE FOR MULTIPLEXER 108 ("B2")	0	0
N_ADDR_PTR	8 (ASSEMBLE ONE CDBK FROM 8 BURSTS)	2 (ASSEMBLE ONE BURST FROM TWO CDBK'S)
BURST/CODE BLOCK ("CDBK") INDEX CALCULATION	K[B2B1B0] (MOD(K,8))	N - MOD(J,2) + FLOOR(BST_IDX/4) FOR BST_IDX=0,1,...,7.
		NOTES: FOR BURST 0~3, EVEN INDEX J IS FOR CDBK N, AND ODD INDEX IS FOR CDBK N-1. FOR BURST 4~7, EVEN INDEX IS FOR CDBK N+1, ODD INDEX IS FOR CDBK N. ASSEMBLY CODE NEED BE CAREFUL ON THE ADDR. POINTER POSITION IN HWA.

Figure 3

CODE FOR 3.1.3 (TABLE 1 IN [1]) OF GSM 05.03 V8.5.0 RELEASE 1999

```
LOAD TABLE 1.
TB1;

%INTERLEAVING DESCRIBED IN THE STANDARD
K=0:455;
B=MOD(K,8);
J=2*MOD(49*K,57)+FLOOR(MOD(K,8)/4);

% HWA IMPLEMENTATION

VI=[0 98 82 66];
VI_SEL=MOD(K,4);
VD=[49 51];
ACS=ZEROS(4,114);
FOR KK=2:114
  ACS(:,KK)=MOD(ACS(:,KK-1)+VD(REM((KK-1),2)+1),114);
END
J1=MOD(ACS(:)'+VI(VI_SEL+1),114);

%DEINTERLEAVER FOR INTERLEAVING

J=0:113;

% HWA IMPLEMENTATION

VI_SEL=REM(J,2);
VD=64;
ACS=MOD(VD*FLOOR(J/2),456)
```

401

403

405

CONTINUED IN 4B...

Figure 4A

CONTINUED FROM 4A...

CODE FOR 3.1.3 (TABLE 1 IN [1]) OF GSM 05.03 V8.5.0 RELEASE 1999

```
% HWA IMPLEMENTATION
VI=[0 228];                          } COLUMN 0 AND 4 OF TABLE 1
J1=MOD(ACS+VI(VI_SEL+1),456);          OF GSM STANDARD

VI=[57 285];                         } COLUMN 1 AND 5 OF TABLE 1
J1=MOD(ACS+VI(VI_SEL+1),456);          OF GSM STANDARD

VI=[114 342];                        } COLUMN 2 AND 6 OF TABLE 1
J1=MOD(ACS+VI(VI_SEL+1),456);          OF GSM STANDARD

VI=[171 399];                        } COLUMN 3 AND 7 OF TABLE 1
J1=MOD(ACS+VI(VI_SEL+1),456);          OF GSM STANDARD
```

Figure 4B

(2) 3.2.3 (TABLE 4 IN [1]) OF GSM 05.03 V8.5.0 RELEASE 1999

NO CLOSED FORM EXPRESSIONS PROVIDED BY THE STANDARD.
K=0:227; (DEPTH 4)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,13,8,9,4,5,12,1,16,2,17,10,11,15, 6,7,3,14,18)×6 (SEE NOTE 1)	(0,18,8,28,4,22,12,34,16,36,14 ,32, 10, 30,6,24,2,26,20)
VI_SEL	MOD(FLOOR(K/2),19) RPT(0,0,1,1,2,2,...,17,17,18,18)	MOD(FLOOR(J/12),19) (0R12,1R12, ...,7R12, 8R12,9R6) FOR BST 0 AND 2; MOD(FLOOR((J+6)/12),19) FOR BST 1 AND 3. THE FLOOR ACCUMULATOR MUST BE INITIALIZED WITH 9. (9R6,10R12,11R12,...,18R12)
VD	(2)	(38)
ACS_INITV	0	0 FOR BURST 0 AND 2; 114 FOR BURST 1 AND 3.
ACS UPDATE RATE	1/38	½
SUBTRACT_V	0 (NOT USED. SET 0 TO SAVE POWER)	228
B0	0	0
B1	0	0
B2	0	0
N_ADDR_PTR	4 (ASSEMBLE 1 CDBK FROM 4 BURSTS)	2 (ASSEMBLE ONE BURST FROM 2 CDBK'S)
BURST/CDBK_IDX CALCULATION	B=VI[B1]+2*LSB(K)+FLOOR(J0/114) (REFER FIG.4 FOR VI AND J0)	BURST INDEX 0&2 OR 1&3 ARE MAPPED FROM CDBK INDEX N AND N-1 RESPECTIVELY.
NOTES	1. THE INPUT VECTOR IS 19X7 BITS 2. THE CARRY_IN OF THE OUTPUT ADDER IS CONNECTED TO LSB OF K.	

Figure 5A

(3) 3.3.4 (DEPTH 19) OF GSM 05.03 V8.5.0 RELEASE 1999

K = 0,1,...,455
N = 0,1,...,N,N + 1,...
B = B0 +4N + (K MOD 19) + (K DIV 114)
J = (K MOD 19) + 19 (K MOD 6)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,19,38,57,76,95)	(0,114,228,342)
VI_SEL	MOD(FLOOR(K/19),6)	MOD(-MOD(J,19)+X,4), X IS 2 LSB OF THE CURRENT BURST INDEX, RANGED FROM 0~21.
VD, ACS_INPUT	20	(96, 1)
ACS_INITV	0	0
ACS UPDATE RATE	1	1
SUBTRACT_V	114	114
B0	0	RPT(0R18, 1)
B1	0	0
B2	0	0
N_ADDR_PTR	22 (ASSEMBLE ONE CDBK FROM 22 BURSTS)	6 (ASSEMBLE ONE BURST FROM 6 CDBK'S)
BURST_IDX/CDBK_IDX CALCULATION	(K MOD 19) + (K DIV 114) A DEDICATED CIRCUIT (2 ACCUMULATORS).	2 LSB OF (MOD(J,19)+Y), Y=3,2,1 OR 0 DEPENDING ON CURRENT BURST INDEX.
NOTES:	SUBTRACT_V = 0 FOR ADS TO SAVE POWER. ACS NEED BE RESET WHENEVER MOD(K,19)=0.	CURRENT_BST_IDX RANGES FROM 0 TO 21. N IS THE CURRENT CDBK INDEX. THE DE-INTERLEAVER IS GIVEN J=0,1,...,113 AND CURRENT_BST_IDX AS INPUT, AND OUTPUTS THE K_IDX AND CDBK_IDX. THE CDBK_IDX IS INTERNALLY USED AS THE ADDR POINTER SELECTION AND K_IDX IS USED TO FETCH THE INPUT DATA.

Figure 5B

(4) 3.9.3.2 (TABLE 1 IN [1]) TCH/AFS ONSET OF GSM 05.03 V8.5.0 RELEASE 1999

K = 4,5,6,7, 12,13,14,15,20,21,22,23 ...,455
N = 0,1,...,N,N+1,...
B = B0 + 4N + (K MOD 8) - 4
J = 2((49K) MOD 57) + ((K MOD 8) DIV 4)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(51, 35, 19, 3)	(0, 228), (57, 285), (114, 342), (171, 399)
VI_SEL	MOD(K,4) (RPT(0,1,2,3))	MOD(J,2) (RPT(0,1))
VD	(100)	(64)
ACS_INITV	100	0
ACS UPDATE RATE	¼	1/2
SUBTRACT_V	114	456
B0	0	0
B1	0	0
B2	0	0
N_ADDR_PTR	4 (ASSEMBLE ONE CDBK FROM 4 BURSTS)	2 (ASSEMBLE ONE BURST FROM TWO CDBK'S)
NOTES	BIT DE-REORDERING/DTX REMOVING IS AUTOMATICALLY DONE.	SAME AS 3.1.3 (FIGURE 3). THE 1ST CDBK IS FROM SPEECH CHANNEL, AND THE 2ND CDBK IS FROM ONSET CHANNEL.

Figure 5C

(5) 3.10.1.4 (TABLE 4 IN [1]) TCH/AFS SID_UPDATE OF GSM 05.03 V8.5.0 RELEASE 1999

TOTAL 456 BITS.
I(B,J) = C(N,K)
K = 0,1,...,227
N = 0,1,...,N,N+1,...
B = B0 + 2N + B

I(B,J) = C(N,K+228)
K = 0,1,...,227
N = 0,1,...,N,N+1,...
B = B0 + 2N + ((B + 2) MOD 4)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
NOTES:	RUN 3.2.3 (FIGURE 5A) TWICE ON 1ST AND 2ND 228 BITS RESPECTIVELY. SWITCH ADDRESS POINTERS ACCORDINGLY IN 2ND RUN.	

Figure 5D

(6) 3.10.2 (TABLE 4 IN [1]) TCH/AHS SID_UPDATE_INH OF GSM 05.03 V8.5.0 RELEASE 1999

THE 228 CODED BITS
FOR K = 1,3,5,7,...,227
N = 0,1,...,N,N+1,...
B = B0 + 2N + B - 2

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,13,8,9,4,5,12,1,16,2,17,10,11, 15,6,7,3,14,18)×6 (SEE NOTE 1)	
VI_SEL	MOD(K,19) (RPT(0,1,2,...,17,18))	
VD	(2)	
ACS_INITV	0	
ACS UPDATE RATE	1/19	
SUBTRACT_V	0 (NOT USED. SET 0 TO SAVE POWER)	
B0	0	
B1	0	
B2	0	
N_ADDR_PTR	2 (ASSEMBLE 1 CDBK FROM 2 BURSTS)	
BURST INDEX CALCULATION	B=VI[B1]+2+FLOOR(J0/114) (REFER FIG.4 FOR VI AND J0)	
NOTES	1. THE CARRY_IN OF THE OUTPUT ADDER IS CONNECTED TO "1". 2. THE LSB OF THE OUTPUT J INDEX IS THROWN AWAY.	SAME AS 3.2.3 (FIGURE 5A) EXCEPT USING ADDR. POINTERS OF SID_UPDATE_INH CHANNEL FOR ODD J INDEX AND SPEECH CHANNEL FOR EVEN INDEX.

Figure 5E

(7) 3.10.4.2 (TABLE 4 IN [1]) SID_FIRST_P2 OF GSM 05.03 V8.5.0 RELEASE 1999

THE CODED 228 BITS:
I(B,J) = C(N,K)
FOR K = 0,2,4,6,...,226
N = 0,1,...,N,N+1,...
B = B0 + 2N + B

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,13,8,9,4,5,12,1,16,2,17,10,11,15, 6,7,3,14,18)×6 (SEE NOTE 1)	
VI_SEL	MOD(K,19) (RPT(0,1,2,...,17,18))	
VD	(2)	
ACS_INITV	0	
ACS UPDATE RATE	1/19	
SUBTRACT_V	0 (NOT USED. SET 0 TO SAVE POWER)	
B0	0	
B1	0	
B2	0	
N_ADDR_PTR	2 (ASSEMBLE 1 CDBK FROM 2 BURSTS)	
BURST INDEX CALCULATION	B=VI[B1]+FLOOR(J0/114) (REFER FIG.4 FOR VI AND J0)	
NOTES	1. WHETHER ×6 IS PUT INSIDE THE VECTOR OR OUTSIDE IS TBD, DEPENDING ON THE AVAILABLE INTERFACE BITS. 2. THE CARRY_IN OF THE OUTPUT ADDER IS CONNECTED TO "0". 3. THE LSB OF THE OUTPUT J INDEX IS THROWN AWAY.	SAME AS 3.2.3 (FIGURE 5A) EXCEPT USING ADDR. POINTERS OF SID_FIRST_P2 CHANNEL FOR EVEN J INDEX AND SID_FIRST_P1 CHANNEL FOR ODD J INDEX.

Figure 5F

(8) 3.11.4 E_TCH/F28.8 OF GSM 05.03 V8.5.0 RELEASE 1999

K = 0,1,...,1367
N = 0,1,...,N,N+1,...
B = B0 + 4N + (K MOD 19) + (K DIV 342)
J = (K MOD 19) + 19(K MOD 18)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17)X19	(0,342,684,1026)
VI_SEL	MOD(FLOOR(K/19),18)	MOD(-MOD(J,19)+X,4), X IS 2 LSB OF THE CURRENT BURST INDEX, RANGED FROM 0~21.
VD, ACS_INPUT	(20)	(324, 1)
ACS_INITV	0	0
ACS UPDATE RATE	1	1
SUBTRACT_V	342	342
B0	0	RPT(0R18, 1)
B1	0	0
B2	0	0
N_ADDR_PTR	22 (ASSEMBLE ONE CDBK FROM 22 BURSTS)	6 (ASSEMBLE ONE BURST FROM 6 CDBK'S)
BURST/CDBK INDX CALCULATION	(K MOD 19) + (K DIV 342) SPECIAL CIRCUIT (2 ACCUMULATORS)	2 LSB OF (MOD(J,19)+Y) + N, Y=3,2,1 OR 0 DEPENDING ON CURRENT BURST INDEX.
NOTES:	SUBTRACT_V = 0 FOR ADS TO SAVE POWER.	CURRENT_BST_IDX RANGES FROM 0 TO 21. N IS THE CURRENT CDBK INDEX.

Figure 5G

(9) 4.1.4 (TABLE 1 IN [1]) SACCH OF GSM 05.03 V8.5.0 RELEASE 1999

FOR K = 0,1,...,455
N = 0,1,...,N,N+1,...
B = B0 + 4N + (K MOD 4)
J = 2((49K) MOD 57) + ((K MOD 8) DIV 4)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
N_ADDR_PTR	4 (ASSEMBLE ONE CDBK FROM 4 BURSTS)	1 (ASSEMBLE EACH BURST FROM ONE CDBK)
BURST INDEX CALCULATION	MOD(K,4)	
NOTES:	ONLY DIFFERENCE FROM 3.1.3 (FIGURE 3) IS ONE CDBK MAPPED TO 4 BURSTS INSTEAD OF 8.	IN ORDER TO USE 3.1.3 (FIGURE 3) CONFIGURATION, THE SAME CDBK ADDR POINTER IS INPUT TWICE AS TWO POINTERS.

Figure 5H

(10) 4.3.4 (TABLE 1 IN [1]) FACCH/H OF GSM 05.03 V8.5.0 RELEASE 1999

FOR K = 0,1,...,455
N = 0,1,...,N,N+1,...
B = B0 + 4N + (K MOD 8) - 4((K MOD 8) DIV 6)
J = 2((49K) MOD 57) + ((K MOD 8) DIV 4)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
N_ADDR_PTR	4 (ASSEMBLE ONE CDBK FROM 6 BURSTS)	1 (ASSEMBLE EACH BURST FROM TWO CDBK'S)
BURST INDEX CALCULATION	(K MOD 8) - 4((K MOD 8) DIV 6) = RPT(0,1,2,3,4,5,2,3)	
NOTES:	ONLY DIFFERENCE FORM 3.1.3 (FIGURE 3) IS ONE CDBK MAPPED TO 6 BURSTS INSTEAD OF 8. IN ORDER TO USE 3.1.3 (FIGURE 3) CONFIGURATION, WE STILL INPUT 8 ADDR PTRS WITH THE LAST TWO USING PTR 2 AND 3.	IN ORDER TO USE 3.1.3 (FIGURE 3) CONFIGURATION, THE TWO CDBK POINTERS SHOULD BE THE SAME WHEN PROCESSING BURST PAIR (2, 6) AND (3, 7).

Figure 5l

(11) 5.1.9.1.5 MCS-5 DL HEADER OF GSM 05.03 V8.5.0 RELEASE 1999

THE 100 CODED BITS
FOR K = 0,1,...,99
J = 25(K MOD 4) + ((17K) MOD 25)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,25,50,75)	(0,25,50,75)
VI_SEL	MOD(K,4) (RPT(0,1,2,3))	(0R25, 1R25, 2R25, 3R25) (= FLOOR(J/25))
VD, ACS_INPUT	17	28
ACS_INITV	0	0
ACS UPDATE RATE	1	1
ACS SUBTRACT_V	25	700
ADS SUBTRACT_V	0	100
B0	0	0
B1	0	0
B2	0	0
N_ADDR_PTR	1	1
NOTES:		

Figure 5J

(12) 5.1.9.1.5 MCS-5 DL DATA OF GSM 05.03 V8.5.0 RELEASE 1999

FROM GSM05.03: "**THERE IS NO CLOSED EXPRESSION DESCRIBING THE INTERLEAVER**, BUT IT HAS BEEN DERIVED TAKING THE FOLLOWING APPROACH:"

1. A BLOCK INTERLEAVER WITH A 1392 BIT BLOCK SIZE IS DEFINED:
   K = 0:1391;
   B = MOD(K,4);
   D = MOD(K,464);
   J = 3*(2*MOD(25*D,58) + FLOOR(MOD(D,8)/4) + 2*(-1).^B.*FLOOR(D/232)) + MOD(K,3);
1. THE DATA BIT POSITIONS BEING MAPPED ONTO J = 156,157,...,191 OF EACH INTERLEAVED BLOCK ARE REMOVED.
2. THE BITS ARE RENUMBERED TO FILL OUT THE GAPS BOTH IN J AND K, WITHOUT CHANGING THE RELATIVE ORDER.

THE RESULTING INTERLEAVER TRANSFORM THE BLOCK OF 1248 CODED BITS INTO A BLOCK OF 1248 INTERLEAVED BITS. (**AN EXPLICIT RELATION BETWEEN J' AND K' IS GIVEN IN TABLE 15**)

PARAMETERS	**INTERLEAVER VALUES**	**DE-INTERLEAVER VALUES**
VI	(0,256,158,63,313, 221,151,59,306,21 4,116,21,302,207,1 09,17,264,172,102, 10,260,165,67,323)	(0, 832, 416) FOR BURST0, (267, 1099, 683) FOR BURST1, (468, 52, 884) FOR BURST 2, (735, 319, 1151) FOR BURST3.
VI_SEL	EVERY 5 OR 6 CIRCULAR COUNTER. (SPECIALLY DESIGNED)	MOD(J, 3) (RPT(0,1,2))
VD, ACS_INPUT	120	(936,312)
ACS_INITV	0	0
ACS UPDATE RATE	EVERY 5 OR 6 CYCLES.	1/3.
ACS SUBTRACT_V	348	1248
CONTINUED IN FIGURE 5L...		

Figure 5K

CONTINUED FROM FIGURE 5K...		
ADS SUBTRACT_V	348	1248
B0	0	ONE BIT IS FOR VERY 12 CYCLES. 001101100100110110011001 FOR BURST 0. 011011001001001100100100 11 FOR BURST 1. 011001001001101100100100 11 FOR BURST 2. 110010010011001001001101 10 FOR BURST 3.
B1	0	0
B2	0	0
N_ADDR_PTR	4 (ASSEMBLE ONE CDBK FROM 4 BURSTS, ONE BURST A TIME.)	1 (ASSEMBLE ONE BURST FROM A CDBK)
NOTES:	1. VERY SMALL DEDICATED CIRCUIT IS DESIGNED FOR THE IRREGULARITY OF CONTROL SIGNALS.THE 36 BITS PRUNED IN EACH BURST IS AUTOMATICALLY SKIPPED, I.E. FOR EACH BURST, ONLY INDEX 0~155 AND 192~347 ARE PRODUCED.	1. A DEDICATED HW (BASICALLY A SMALL LUT) FOR ADJUSTING THE PRUNED BITS. THIS ADJUSTMENT IS ACCUMULATING THE LUT CONTENT TO THE ACS CELL EVERY 12 CLOCK CYCLES ACS_ADJ =[0 64 65 66 688 689 690 882 258]; ACS_ADJ_IDX=[0,2,1,1,5,2,1,4,2,2,4,1,2, 7,6,1,1,4,3,1,4,1,3,4,1,1] FOR BURST 0; ACS_ADJ_IDX=[0 1 1 4 3 1 4 1 3 4 1 1 6 7 2 1 4 2 2 4 1 2 5 1 1 2] FOR BURST 1; ACS_ADJ_IDX=[0 2 1 4 2 2 4 1 2 5 1 1 2 8 3 1 4 1 3 4 1 1 6 1 1 1] FOR BURST 2; ACS_ADJ_IDX=[0 1 4 1 3 4 1 1 6 1 1 1 6 7 2 4 1 2 5 1 1 2 5 1 1 5] FOR BURST 3; 2. THE J INDEX 156~191 OF EACH BURST IS LEFT FOR 36 HEADER AND OTHER BITS. SEE API CHAPTER FOR BURST MAPPING CODING STRATEGIES.

Figure 5L

(13) 5.1.9.2.4 MCS-5 UL HEADER OF GSM 05.03 V8.5.0 RELEASE 1999

THE 136 CODED BITS,
FOR K = 0,1,...,135
J = 34(K MOD 4) + 2((11K) MOD 17) + [(K MOD 8)/4]

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,34,68,102)	(0,17,34,51)
VI_SEL	RPT(0,1,2,3)	(0R34, 1R34, 2R34, 3R34) (= FLOOR(J/34))
VD, ACS_INPUT	22	(68,116)
ACS_INITV	0	68
ACS UPDATE RATE	1	1
ACS SUBTRACT_V	37	136
ADS SUBTRACT_V	0	136
B0	0	RPT(01)
B1	0	0
B2	0	0
N_ADDR_PTR	1	1
NOTES:	CONNECT CIN = [(K MOD 8) DIV 4] (K[B2])	

Figure 5M

(14) 5.1.11.1.5 MCS-7 DL HEADER OF GSM 05.03 V8.5.0 RELEASE 1999

THE 124 CODED BITS OF THE HEADER,
FOR K = 0,1,...,123
J = 31(K MOD 4) + ((17K) MOD 31)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,31,62,93)	(0,93,62,31)
VI_SEL	MOD(K,4) (RPT(0,1,2,3))	(0R31, 1R31, 2R31, 3R31) (= FLOOR(J/31))
VD, ACS_INPUT	17	(104)
ACS_INITV	0	0
ACS UPDATE RATE	1	1
ACS SUBTRACT_V	31	124
ADS SUBTRACT_V	0	124
B0	0	0
B1	0	0
B2	0	0
N_ADDR_PTR	1	1
NOTES:		

Figure 5N

(15) 5.1.11.1.5 MCS-7 DL DATA OF GSM 05.03 V8.5.0 RELEASE 1999

K = 0,1,...,1223
J = 306(K MOD 4) + 3((44K) MOD 102 + (K DIV 4) MOD 2) + (K + 2 - (K DIV 408)) MOD 3

PARAMETERS	**INTERLEAVER VALUES**	**DE-INTERLEAVER VALUES**
VI	(2,132,265,92,0, 133, 266,90,1,134,264,91)	4*(204,102,0,255,153,51) FOR BURST 1 4*(242 140 38 293 191 89) FOR BURST 2 4*(280 178 76 229 127 25) FOR BURST 3 4*(216 114 12 267 165 63) FOR BURST 4
VI_SEL	MOD (MOD (K,12)+FLOOR(K/408)*8, 12)	MOD(J,6) (RPT(0,1,2,3,4,5))
VD, ACS_INPUT	(225,219)	4*(40,142,40,142)
ACS_INITV	0	0
ACS UPDATE RATE	¼	1/6
ACS SUBTRACT_V	306	4*306
ADS SUBTRACT_V	306	4*306
B0	K[B2] (RPT(00001111))	(EVERY BIT LAST 3 CYCLES, STARTS AFTER FIRST 6 CYCLES) **FOR BURST 0:** 11100110110110011011011001111001 10011110011001111001101101001100 11011001101101100111001100111100 110 **FOR BURST 1:** 10011011011001101101100111001100 11110011001111001101101100110110 11001111001100111100110011111001 1011
CONTINUED IN FIGURE 5P...		

Figure 5O

CONTINUED FROM FIGURE 5P... B0		**FOR BURST 2:** 0110110110011110011001111001100111100110110110011011011001101101001111001100111100110011110011001101101101 **FOR BURST 3:** 1011011001111001100111100110011110011011011001101101100111100110011110011001101101100111001101101101100
B1	0	RPT(000111)
B2	0	RPT(000111)
N_ADDR_PTR	4 (ASSEMBLE ONE CDBK FROM 4 BURSTS. EVERY 4 BITS ARE FROM BURST 0,1,2,AND 3 RESPECTIVELY.)	1 (ASSEMBLE EACH BURST FROM A SINGLE CDBK)
CDBK/BURST ADDR CALCULATION	BURST_IDX = MOD(K,4)	BIT_OFST = 0,1,2,3 FOR BURST 0,1,2,3 RESPECTIVELY.
NOTES:		

Figure 5P

(16) 5.1.11.2.4 MCS-7 UL HEADER OF GSM 05.03 V8.5.0 RELEASE 1999

THE 160 CODED BITS OF THE HEADER,
FOR K = 0,1,...,159
J = 40(K MOD 4) + 2((13(K DIV 8)) MOD 20) + ((K MOD 8) DIV 4)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0,40 80 120)	(0,1,2,3)
VI_SEL	RPT(0,1,2,3) (=K[B1B0])	(0R40, 1R40, 2R40, 3R40) (= FLOOR(J/31))
VD, ACS_INPUT	26	(4,132)
ACS_INITV	0	0
ACS UPDATE RATE	1/8	1
ACS SUBTRACT_V	40	160
ADS SUBTRACT_V	0	0
B0	0	RPT(0,1)
B1	0	0
B2	0	0
N_ADDR_PTR	1	1
NOTES:	CARRY_IN = FLOOR(MOD(K,8)/4) (=K[B2])	
NOTES:		

Figure 5Q

(17) 5.1.12.1.5 MCS-8, DL DATA OF GSM 05.03 V8.5.0 RELEASE 1999

K = 0,1,...,1223
J = 306(2(K DIV 612) + (K MOD 2)) + 3((74K) MOD 102 + (K DIV 2) MOD 2) + (K + 2 - (K DIV 204)) MOD 3

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(2,0,4,5,0,1,5,3, 1,2,3,4)	2*(204,102,0,255,153,51) FOR BURST 0 2*(280,178,76,229,127,25) FOR BURST 1 SAME AS BURST 0 FOR BURST 2 SAME AS BURST 1 FOR BURST 3
VI_SEL	MOD (MOD (K,12)+FLOOR(K/204)*8, 12)	RPT(0,1,2,3,4,5)
VD, ACS_INPUT	222	2*(20,122)
ACS_INITV	0	0
ACS UPDATE RATE	1	1/6
ACS SUBTRACT_V	306	2*306
ADS SUBTRACT_V	0	2*306
B0 **CONTINUED IN FIGURE 5S...**	0	(EVERY BIT LAST 3 CYCLES, STARTS AFTER FIRST 6 CYCLES) **FOR BURST 0:** 11111011110111101111011110111101 11101111011110111101111110110111 11101101111110110111111011011111 1011 **FOR BURST 1:** 11011110111101111011110111111011 01111110110111111011011111101101 11111011011111101111011110111101 1110

Figure 5R

CONTINUED FROM FIGURE 5R... B0		**FOR BURST 2:** 11111011110111101111011110111101 11101111011110111101111110110111 11101101111110110111111011011111 1011 **FOR BURST 3:** 11011110111101111011110111111011 01111110110111111011011111101101 11111011011111101111011110111101 1110
B1	0	RPT(000111) (=MOD(FLOOR(J/3),2)
B2	0	RPT(000111) (=MOD(FLOOR(J/3),2)
N_ADDR_PTR	4 (ASSEMBLE ONE CDBK FROM 4 BURSTS. THE 1ST 612 BITS ARE FROM BURST 0 AND 1. THE 2ND 612 BITS ARE FROM BURST 2 AND 3.)	1 (ASSEMBLE EACH BURST FROM A SINGLE CDBK)
CDBK/BURST ADDR CALCULATION	BURST_IDX = K[B0]+FLOOR(K/612)*2 (RPT(0,1) 306 TIMES + RPT(2,3) 306 TIMES)	BIT_OFST = 0,1,612,613 FOR BURST 0,1,2,3 RESPECTIVELY.
NOTES:		

Figure 5S

(18) WCDMA 2ND INTERLEVER OF 3GPP TS 25.212-V.3.5.0 (2000-12), RELEASE 1999

THE 2ND INTERLEAVING IS A BLOCK INTERLEAVER AND CONSISTS OF BITS INPUT TO A MATRIX WITH PADDING, THE INTER-COLUMN PERMUTATION FOR THE MATRIX AND BITS OUTPUT FROM THE MATRIX WITH PRUNING. THE BITS INPUT TO THE BLOCK INTERLEAVER ARE DENOTED BY $u_{p,1}, u_{p,2}, u_{p,3}, \ldots, u_{p,U}$, WHERE P IS PHCH NUMBER AND U IS THE NUMBER OF BITS IN ONE RADIO FRAME FOR ONE PHCH. THE OUTPUT BIT SEQUENCE FROM THE BLOCK INTERLEAVER IS DERIVED AS FOLLOWS:

(1)ASSIGN C2 = 30 TO BE THE NUMBER OF COLUMNS OF THE MATRIX. THE COLUMNS OF THE MATRIX ARE NUMBERED 0, 1, 2, ..., C2 - 1 FROM LEFT TO RIGHT.

(2)DETERMINE THE NUMBER OF ROWS OF THE MATRIX, R2, BY FINDING MINIMUM INTEGER R2 SUCH THAT:

$U \leq R2 \times C2$.

THE ROWS OF RECTANGULAR MATRIX ARE NUMBERED 0, 1, 2, ..., R2 - 1 FROM TOP TO BOTTOM.

(3)WRITE THE INPUT BIT SEQUENCE $u_{p,1}, u_{p,2}, u_{p,3}, \ldots, u_{p,U}$ INTO THE R2 × C2 MATRIX ROW BY ROW STARTING WITH BIT $y_{p,1}$ IN COLUMN 0 OF ROW 0:

$$\begin{bmatrix} y_{p,1} & y_{p,2} & y_{p,3} & \cdots & y_{p,C2} \\ y_{p,(C2+1)} & y_{p,(C2+2)} & y_{p,(C2+3)} & \cdots & y_{p,(2\times C2)} \\ \vdots & \vdots & \vdots & \cdots & \vdots \\ y_{p,((R2-1)\times C2+1)} & y_{p,((R2-1)\times C2+2)} & y_{p,((R2-1)\times C2+3)} & \cdots & y_{p,(R2\times C2)} \end{bmatrix}$$

WHERE $y_{p,k} = u_{p,k}$ FOR K = 1, 2, ..., U AND IF R2 × C2 > U, THE DUMMY BITS ARE PADDED SUCH THAT $y_{p,k}$ = 0 OR 1 FOR $K = U + 1, U + 2, \ldots, R2 \times C2$. THESE DUMMY BITS ARE PRUNED AWAY FROM THE OUTPUT OF THE MATRIX AFTER THE INTER-COLUMN PERMUTATION.

Figure 6A

CONTINUED FROM FIGURE 6A...

(4) PERFORM THE INTER-COLUMN PERMUTATION FOR THE MATRIX BASED ON THE PATTERN $\langle P2(j)\rangle_{j\in\{0,1,\ldots,C2-1\}}$ THAT IS SHOWN IN THE END OF THIS DESCRIPTION, WHERE P2(*J*) IS THE ORIGINAL COLUMN POSITION OF THE *J*-TH PERMUTED COLUMN. AFTER PERMUTATION OF THE COLUMNS, THE BITS ARE DENOTED BY $y'_{p,k}$.

$$\begin{bmatrix} y'_{p,1} & y'_{p,(R2+1)} & y'_{p,(2\times R2+1)} & \cdots y'_{p,((C2-1)\times R2+1)} \\ y'_{p,2} & y'_{p,(R2+2)} & y'_{p,(2\times R2+2)} & \cdots y'_{p,((C2-1)\times R2+2)} \\ \vdots & \vdots & \vdots & \cdots \quad \vdots \\ y'_{p,R2} & y'_{p,(2\times R2)} & y'_{p,(3\times R2)} & \cdots \quad y'_{p,(C2\times R2)} \end{bmatrix}$$

(5) THE OUTPUT OF THE BLOCK INTERLEAVER IS THE BIT SEQUENCE READ OUT COLUMN BY COLUMN FROM THE INTER-COLUMN PERMUTED R2 × C2 MATRIX. THE OUTPUT IS PRUNED BY DELETING DUMMY BITS THAT WERE PADDED TO THE INPUT OF THE MATRIX BEFORE THE INTER-COLUMN PERMUTATION, I.E. BITS $y'_{p,k}$ THAT CORRESPONDS TO BITS $y_{p,k}$ WITH $K>U$ ARE REMOVED FROM THE OUTPUT. THE BITS AFTER 2ND INTERLEAVING ARE DENOTED BY $v_{p,1}, v_{p,2}, \ldots, v_{p,U}$, WHERE $V_{P,1}$ CORRESPONDS TO THE BIT $y'_{p,k}$ WITH SMALLEST INDEX *K* AFTER PRUNING, $V_{P,2}$ TO THE BIT $y'_{p,k}$ WITH SECOND SMALLEST INDEX *K* AFTER PRUNING, AND SO ON.

(6) THE COLUMN PERMUTATION PATTERN:

<0, 20, 10, 5, 15, 25, 3, 13, 23, 8, 18, 28, 1, 11, 21, 6, 16, 26, 4, 14, 24, 19, 9, 29, 12, 2, 7, 22, 27, 17>

Figure 6B

TABLE OF PARAMETERS AND PARAMETER VALUES USED WITH WCDMA 2ND INTERLEAVER OF 3GPP TS 25.212-V.3.5.0 (2000-12), RELEASE 1999

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	(0, 20, 10, 5, 15, 25, 3, 13, 23, 8, 18, 28, 1, 11, 21, 6, 16, 26, 4, 14, 24, 19, 9, 29, 12, 2, 7, 22, 27, 17)	(0, 12, 25, 6, 18, 3, 15, 26, 9, 22, 2, 13, 24 , 7, 19, 4, 16, 29, 10, 21, 1, 14, 27, 8, 20, 5, 17, 28, 11, 23)*NUM_ROW
VI_SEL	NUM_ROW = FLOOR(BLOCK_LTH/30); NUM_FULL_COLUMN = BLOCK_LTH - NUM_ROW*30; VI_SEL=0; IF VI(VI_SEL)<NUM_FULL_COLUMN FOR EVERY NUM_ROW+1 CYCLES, VI_SEL = VI_SEL+1; ACS RESET; ELSE FOR EVERY NUM_ROW CYCLES, VI_SEL = VI_SEL+1; ACS RESET; END	MOD(J, 30) RPT(0,1,2,...,29)
NOTES FOR INTERLEAVER: VI_SEL IS A COUNTER FROM 0:29 AND IS UPDATED EVERY COL_LTH CYCLES, WHERE COL_LTH COULD BE EITHER N_ROW OR N_ROW+1. THE ALGORITHM IS: (INITIALIZATION) = INPUT PARAMETERS END NUM_ROW = NUM_FULL_COL = VI_SEL = -1 FOR VI_SEL = 0:29 ACS = 0; IF ELSE END (FOR KK = 1 = COL_LTH, DO ACS AND OUTPUT UPDATE) **CONTINUED IN FIGURE 6D...**		

Figure 6C

CONTINUED FROM FIGURE 6C...

NOTES FOR DE-INTERLEAVER:
FOR COL_IDX = 1:30, ACS = 0; VI_SEL = VI_SEL + 1;
IF VI(VI_SEL) < NUM_FULL_COL
COL_LTH = NUM_ROW +1;
ELSE
COL_LTH = NUM_ROW;
END (FOR KK = 1 = COL_LTH, DO; END FOR)

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VD	30	1
ACS_INITV	0	0
ACS UPDATE RATE	1/1 (EVERY CYCLE) ACS RESET AT EVERY NUM_ROW OR NUM_ROW-1 CYCLES.	1/30 (EVERY 30 CYCLES)
ACS SUBTRACT_V	>19200 FOR UE 384K CLASS.	>640 FOR UE 384K CLASS.
ADS SUBTRACT_V	>19200 FOR UE 384K CLASS.	>19200 FOR UE 384K CLASS.
B0	0	0
B1	0	0
B2	0	0
N_ADDR_PTR	1	1

NOTES FOR DE-INTERLEAVER:
THE ADJUST VALUE ADDED TO ADS FROM PRUNING ADJUST BLOCK IS OBTAINED BY A 30 ELEMENT LUT INDEXED BY VI_SEL. THIS LUT IS BASED ON THE NUMBER OF FULL COLUMN (N_FC) AND THUS IS DIFFERENT FOR DIFFERENT NUMBER OF FULL COLUMNS WHEN THE BLOCK SIZE IS NOT DIVISIBLE BY 30 (THE CASE DUMMY BITS EXIST). SEE FIGS. 6E & 6F.

Figure 6D

ADS ADJUSTMENT VALUES FOR WCDMA 2ND DE-INTERLEAVING

N_FC	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	0	1	2	1	2	1	2	2	1	2	1	2	2	1	2
3	0	1	2	1	2	1	2	3	1	2	1	2	2	1	2
4	0	2	3	1	3	1	3	4	2	3	1	3	3	2	3
5	0	2	4	1	3	1	3	5	2	4	1	3	4	2	4
6	0	3	5	2	4	1	4	6	3	5	1	4	5	3	5
7	0	3	6	2	5	1	4	7	3	6	1	4	6	3	6
8	0	3	6	2	5	1	4	7	3	6	1	4	6	3	6
9	0	4	7	2	6	1	5	8	3	7	1	5	7	3	7
10	0	4	8	2	6	1	5	9	3	7	1	5	8	3	7
11	0	5	9	3	7	2	6	10	4	8	1	6	9	4	8
12	0	5	10	3	8	2	7	11	4	9	1	6	10	4	9
13	0	5	11	3	8	2	7	12	4	9	1	6	10	4	9
14	0	6	12	3	9	2	8	13	5	10	1	7	11	4	10
15	0	6	13	3	9	2	8	14	5	11	1	7	12	4	10
16	0	7	14	4	10	2	9	15	6	12	1	8	13	5	11
17	0	7	15	4	11	2	9	16	6	13	1	8	14	5	12
18	0	7	15	4	11	2	9	16	6	13	1	8	14	5	12
19	0	8	16	4	12	2	10	17	6	14	1	9	15	5	13
20	0	8	17	4	12	2	10	18	6	15	1	9	16	5	13
21	0	9	18	5	13	3	11	19	7	16	2	10	17	6	14
22	0	9	19	5	14	3	12	20	7	17	2	10	18	6	15
23	0	9	19	5	14	3	12	20	7	17	2	10	18	6	15
24	0	10	20	5	15	3	13	21	8	18	2	11	19	6	16
25	0	10	21	5	15	3	13	22	8	19	2	11	20	6	16
26	0	11	22	6	16	3	14	23	9	20	2	12	21	7	17
27	0	11	23	6	17	3	14	24	9	21	2	12	22	7	18
28	0	11	23	6	17	3	14	24	9	21	2	12	22	7	18
29	0	12	24	6	18	3	15	25	9	22	2	13	23	7	19

Figure 6E

ADS ADJUSTMENT VALUES FOR WCDMA 2ND DE-INTERLEAVING

N_FC	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	2	2	1	2	1	2	2	1	2	1	2	2	1	2
3	1	2	3	1	2	1	2	3	1	2	1	2	3	1	2
4	1	3	4	2	3	1	3	4	2	3	1	3	4	2	3
5	1	3	5	2	4	1	3	5	2	4	1	3	5	2	4
6	2	4	6	3	5	1	4	6	3	5	2	4	6	3	5
7	2	5	7	3	6	1	4	7	3	6	2	5	7	3	6
8	2	5	8	3	6	1	4	8	3	6	2	5	8	3	6
9	2	6	9	4	7	1	5	9	3	7	2	6	9	4	7
10	2	6	10	4	7	1	5	10	3	7	2	6	10	4	8
11	3	7	11	5	8	1	6	11	4	8	3	7	11	5	9
12	3	8	12	5	9	1	7	12	4	9	3	8	12	5	10
13	3	8	13	5	9	1	7	13	4	9	3	8	13	5	10
14	3	9	14	6	10	1	8	14	5	10	3	9	14	6	11
15	3	9	15	6	11	1	8	15	5	11	3	9	15	6	12
16	3	10	16	7	12	1	9	16	6	12	4	10	16	7	13
17	3	10	17	7	13	1	9	17	6	13	4	11	17	7	14
18	3	10	17	7	13	1	9	17	6	13	4	11	17	7	14
19	3	11	18	7	14	1	10	18	6	14	4	12	18	8	15
20	3	11	19	7	14	1	10	19	6	14	4	12	19	8	16
21	4	12	20	8	15	1	11	20	7	15	5	13	20	9	17
22	4	13	21	8	16	1	11	21	7	16	5	14	21	9	18
23	4	13	22	8	16	1	11	21	7	16	5	14	22	9	18
24	4	14	23	9	17	1	12	22	7	17	5	15	23	10	19
25	4	14	24	9	18	1	12	23	7	17	5	15	24	10	20
26	4	15	25	10	19	1	13	24	8	18	5	16	25	11	21
27	4	15	26	10	20	1	13	25	8	19	5	16	26	11	22
28	4	15	27	10	20	1	13	25	8	19	5	16	26	11	22
29	4	16	28	10	21	1	14	26	8	20	5	17	27	11	23

Figure 6F

3GPP2 C.S0002-C VERSION 1.0

2.1.3.1.7 BLOCK INTERLEAVING

FOR I=0,...,N-1

THE DATA IS READ OUT AT THE ADDRESS: $AI=2^M(I \text{ MODJ}) + BRO_M(\text{FLOOR}(I/J)$
WHERE N,M,J ARE GIVEN IN TABLE 2.1.3.1.7.1

AND $BRO_M(Y)$ INDICATES THE BIT-REVERSED M-BIT VALUE OF Y (I.E., $BRO_3(6) = 3$).

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	TABLE OF DIMENSION 2^M $BRO_M(0,1,...,(2^M-1))$ (SEE NOTE BELLOW)	TABLE OF DIMENSION 2^M $J^* BRO_M(0,1,...,(2^M-1))$ (SEE NOTE BELLOW)
VI_SEL	FLOOR(I/J)	MOD(AI,2^M-1) (RPT(0,...,2^M-1)) IF LOOK UP TABLE
VD	2^M	1
ACS_INITV	0	0
ACS UPDATE RATE	1	$1/2^M$
SUBTRACT_V	N	N
B0	0	0
B1	0	0
B2	0	0
N_ADDR_PTR	1(ASSEMBLE ONE BURST FROM ONE CDBK)	1(ASSEMBLE ONE CDBK FROM ONE BURST)
BURST/CDBK_IDX CALCULATION	UNIQUE BURST POINTER NO BIT OFFSET	UNIQUE CDBK POINTER NO BIT OFFSET
NOTES	THE VI TABLES CAN EASILY BE REPLACED BY AN INITIAL VALUE GENERATOR MODULE AS SHOWN IN FIGURE 2. IN SUCH CASE, BOTH VI AND VI_SEL ARE NOT USED.	

Figure 7A

3GPP2 C.S0002-C VERSION 1.0

3.1.3.1.7.1.2 FORWARD-BACKWARDS BIT-REVERSAL ORDER INTERLEAVER

FOR I=0,...,N-1
THE INTERLEAVED SYMBOLS ARE READ OUT AT THE ADRESS:

$AI=2^M(I/2 \text{ MODJ}) + BRO_M(\text{FLOOR}(I/2/J)$ FOR I=0,2,....,N-2

$AI=2^M((N-(I+1)/2) \text{ MODJ}) + BRO_M(\text{FLOOR}((N-(I+1)/2/J)$ FOR I=1,3,....,N-1

WHERE N,M,J ARE GIVEN IN TABLE 3.1.3.1.7-1

AND $BRO_M(Y)$ INDICATES THE BIT-REVERSED M-BIT VALUE OF Y(I.E., $BRO_3(6) = 3$).

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	TABLE OF DIMENSION 2^M WITH THE VALUES $BRO_M(0, 2^M-1, 1, 2^M-2, 2, 2^M-3,..., 2^{M-1}-1, 2^{M-1})$ (SEE NOTE BELLOW)	TABLE OF DIMENSION 2^M WITH THE VALUES J* $BRO_M(0, 2^M-1, 1, 2^M-2, 2, 2^M-3,..., 2^{M-1}-1, 2^{M-1})$ (SEE NOTE BELLOW)
VI_SEL	2 * FLOOR(I/2/J) + MOD(I,2)	MOD(AI, 2^M) (RPT(0,1,..., 2^M-1))
VD	2^M FOR ACS0, N-2^M FOR ACS1	2 FOR ACS0, N-2 FOR ACS1
ACS_INITV	0 FOR ACS0, N-2^M FOR ACS1	0 FOR ACS0, J-1 FOR ACS1
ACS UPDATE RATE	1/2	$1/2^M$
SUBTRACT_V	N	N
B0	MOD(I,2) (RPT(0,1))	MOD(AI,2) (RPT(0,1))
B1	0	0
B2	MOD(I,2) (RPT(0,1))	MOD(AI,2) (RPT(0,1))
N_ADDR_PTR	1(ASSEMBLE ONE BURST FROM ONE CDBK)	1(ASSEMBLE ONE CDBK FROM ONE BURST)
BURST/CDBK_IDX CALCULATION	UNIQUE BURST POINTER NO BIT OFFSET	UNIQUE BURST POINTER NO BIT OFFSET

NOTES: THE INTERLEAVER WORKS ON THE TWO ACS TO DEAL ALTERNATIVELY WITH ODD AND EVEN NUMBERS. THE VI TABLES CAN EASILY BE REPLACED BY AN INITIAL VALUE GENERATOR MODULE AS SHOWN IN FIGURE 2. IN THIS CASE, BOTH VI AND VI_SEL ARE NOT USED.

Figure 7B

3GPP2 C.S0002-C VERSION 1.0

2.1.3.1.7 BLOCK INTERLEAVING FOR REVERSE TRAFFIC CHANNEL WITH RADIO CONFIGURATION 1 AND 2

ARRAY WITH 32 ROWS AND 18 COLUMNS (I.E. 576 CELLS)
SYMBOLS ARE WRITEN BY COLUMNS, OUPUT BY ROWS.
THE INTERLEAVER ROWS SHALL BE OUPUT IN THE FOLLOWING ORDER:
AT 9600 OR 14400BPS:
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
AT 4800 OR 7200 BPS:
1 3 2 4 5 7 6 8 9 11 10 12 13 15 14 16 17 19 18 20 21 23 22 24 25 27 26 28 29 31 30 32
AT 2400 OR 3600 BPS:
1 5 2 6 3 7 4 8 9 13 10 14 11 15 12 16 17 21 18 22 19 23 20 24 25 29 26 30 27 31 28 32
AT 1200 OR 1800 BPS:
1 9 2 10 3 11 4 12 5 13 6 14 7 15 8 16 17 25 18 26 19 27 20 28 21 29 22 30 23 31 24 32

PARAMETERS	INTERLEAVER VALUES	DE-INTERLEAVER VALUES
VI	TABLE OF DIMENSION 32 WITH ITS VALUES EQUAL TO THE ORDER OF READING OF ROWS (SEE NOTE BELLOW)	TABLE OF DIMENSION 32 WITH ITS VALUES EQUAL TO THE ORDER OF READING OF ROWS (SEE NOTE BELLOW)
VI_SEL	FLOOR(J/18)	FLOOR(I/32)
VD	32	18
ACS_INITV	0	0
ACS UPDATE RATE	1	1
SUBTRACT_V	576	576
B0	0	0
B1	0	0
B2	0	0
N_ADDR_PTR	1(ASSEMBLE ONE BURST FROM ONE CDBK)	1(ASSEMBLE ONE CDBK FROM ONE BURST)
BURST/CDBK_IDX CALCULATION	UNIQUE BURST POINTER NO BIT OFFSET	UNIQUE BURST POINTER NO BIT OFFSET

NOTES: THE VI TABLES CAN EASILY BE REPLACED BY A GENERATOR MODULE AS SHOWN IN FIGURE 2. IN THIS CASE, BOTH VI AND VI_SEL ARE NOT USED. THE VALUES OF VI TABLE INDICATE THE RIGHT-CIRCULAR-SHIFTED M-BIT VALUE OF Y (RSHFTM(Y) I.E., RSHFT4(3) = 9).WITH M=1 (NO SHIFT) AT 9600 OR 14400 BPS, M=2 AT 4800 OR 7200 BPS, M=3 AT 2400 OR 3600 BPS AND M=4 AT 1200 OR 1800 BPS.

Figure 7C

3GPP2 C.S0002-C VERSION 1.0

3.1.3.1.7.2 SPREADING RATE 3 INTERLEAVING (IMPLEMENTATION WITH 3 ACS)

THE BLOCK INTERLEAVER SHALL DEMULTIPLEX ITS INPUT SYMBOLS INTO THREE BLOCKS WITH N/3 SYMBOLS EACH.
THE SYMBOLS INPUT TO BLOCK INTERLEAVER K (K = 0, 1, 2) ARE WRITTEN SEQUENTIALLY INTO ADDRESSES 0 TO N/3 – 1. THE INTERLEAVED SYMBOLS ARE READ OUT IN A PERMUTED ORDER, WITH THE I-TH ADDRESS BEING READ FROM ADDRESS AI, AS FOLLOWS:

AI=M[(I+FLOOR(KN/9))MODJ] +BROM[FLOOR[(+FLOOR(KN/9))MOD(N/3))J]]
WHERE I = 0 TO N/3 – 1,
M AND J ARE GIVEN IN TABLE 3.1.3.1.7-1 USING INTERLEAVER BLOCK SIZE N/3
X INDICATES THE LARGEST INTEGER LESS THAN OR EQUAL TO X, AND
BROM(Y) INDICATES THE BIT-REVERSED M-BIT VALUE OF Y (I.E., $BRO_3(6) = 3$).

THE THREE INTERLEAVED BLOCK OUTPUTS SHALL THEN BE MULTIPLEXED TOGETHER.

PARAMETERS	**INTERLEAVER VALUES**	**DE-INTERLEAVER VALUES**
VI	TABLE OF DIMENSION 2^M WITH THE VALUES $BRO_M(0,1,...,(2^M-1))$ (SEE NOTE BELLOW)	TABLE OF DIM 2^M WITH THE VALUES $J*BRO_M(0,1,..., 2^M-1)$ (SEE NOTE BELLOW)
VI_SEL	FLOOR(MOD(I+FLOOR(KN/9),N/3)/J), FOR ACS_K K=0,1,2	MOD(FLOOR(AI/3),2^M)
VD	2^M FOR ALL 3 ACS (ACS0, ACS1, AND ACS2)	1 FOR ALL 3 ACS.
ACS_INITV	0 FOR ACS0, N/9 FOR ACS1, 2N/9 FOR ACS2	0 FOR ACS0, 2N/9 FOR ACS1, N/9 FOR ACS2
ACS UPDATE RATE	1/3	$1/(3*2^M)$
SUBTRACT_V	N/3	N/3
B0	RPT(010)	RPT(010)
B1	RPT(001)	RPT(001)
B2 (B21 B20)	=B1 B0 (MOD3)	=B1 B0 (MOD3)
CONTINUED IN FIGURE 7E...		

Figure 7D

CONTINUED FROM FIGURE 7D...		
PARAMETERS	**INTERLEAVER VALUES**	**DE-INTERLEAVER VALUES**
N_ADDR_PTR	1	1
BURST/CDBK_IDX CALCULATION	FINAL_BIT_ADDR = ADS_OUTPUT*3+ MOD(I,3) FOR ACS_K K=0,1,2	FINAL_BIT_ADDR = ADSOUTPUT*3+ MOD(AI,3) FOR ACS_K K=0,1,2
NOTES	THE VI TABLES CAN EASILY BE REPLACED BY A GENERATOR MODULE AS SHOWN IN FIGURE 2. IN THIS CASE, BOTH VI AND VI_SEL ARE NOT USED. USE OF THREE ACS => ALTHOUGH ONLY 2 ACS ARE SHOWN IN FIGURE 2, ARBITRARY NUMBER OF ACS CAN BE ADDED FOR MORE GENERAL CASES. IN THE CASE OF 3 ACS, B2 MUST HAVE TWO SELECT LINES TO SELECT THE RIGHT ACS.	

Figure 7E

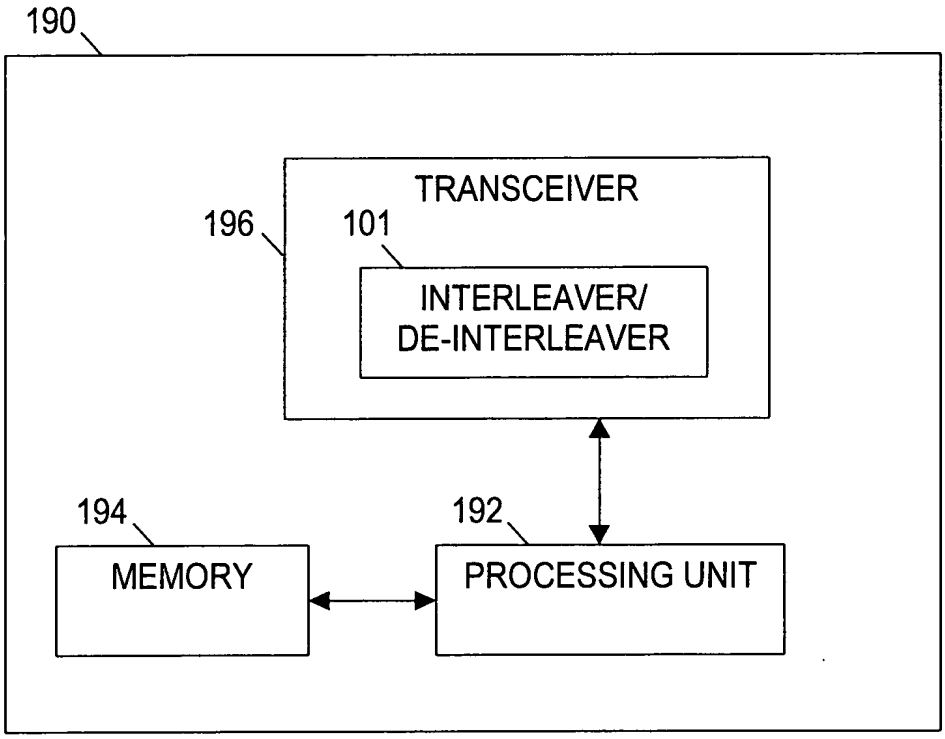
190
TRANSCEIVER
196
101
INTERLEAVER/
DE-INTERLEAVER
194
192
MEMORY
PROCESSING UNIT

Figure 8

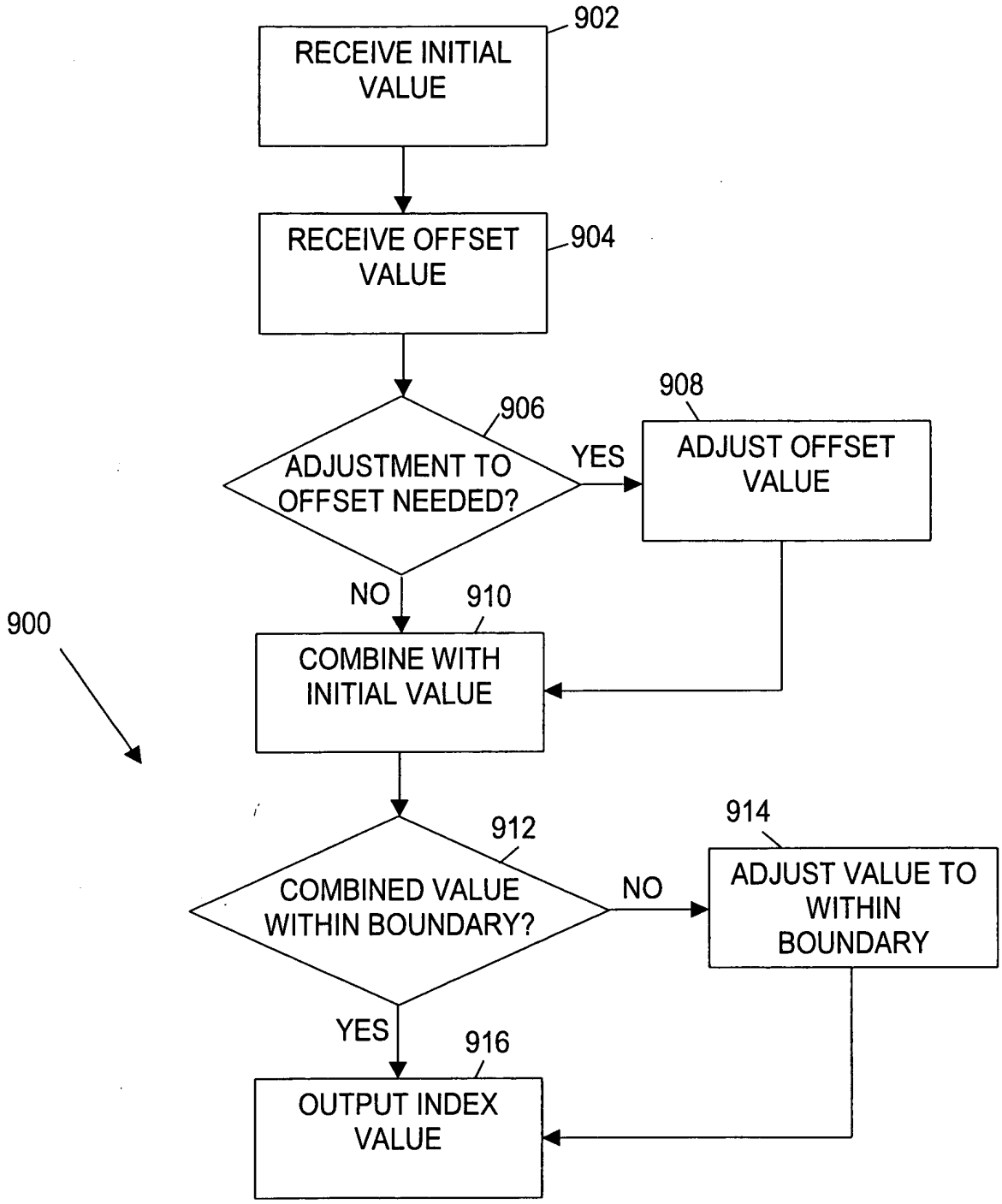
900
902
RECEIVE INITIAL VALUE
904
RECEIVE OFFSET VALUE
906
ADJUSTMENT TO OFFSET NEEDED?
YES
908
ADJUST OFFSET VALUE
NO
910
COMBINE WITH INITIAL VALUE
912
COMBINED VALUE WITHIN BOUNDARY?
NO
914
ADJUST VALUE TO WITHIN BOUNDARY
YES
916
OUTPUT INDEX VALUE

Figure 9